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**PROGRESS REPORT OPERABLE UNIT 5
ENVIRONMENTAL MEDIA FEBRUARY 1993**

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Fernald Project

Remedial Investigation/ Feasibility Study

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PROGRESS REPORT

FEBRUARY 1993

Operable Unit 5 ENVIRONMENTAL MEDIA

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Introduction

The Remedial Investigation/Feasibility Study (RI/FS) is the blueprint for cleanup at the U.S. Department of Energy's Fernald Environmental Management Project. The nature and extent of contamination at the Fernald site and surrounding areas is being thoroughly investigated so that appropriate remedial actions can be formulated and implemented.

The Fernald site has been divided into five sections, known as Operable Units, for environmental investigation and cleanup. The Operable Units were defined based on their location or the potential for similar technologies to be used in the ultimate cleanup.

During the course of the RI/FS effort, certain conditions are occasionally identified which call for more immediate action. These actions are called "Removal Actions" and are initiated when there is a need to accelerate cleanup activities to address releases or potential releases of hazardous substances. Removal Actions are coordinated with the U.S. EPA and the Ohio EPA.

Following is a progress report on Operable Unit 5 including its history, the current status of RI/FS activities, cleanup alternatives under consideration, and work being done to alleviate near-term concerns.

Background

Operable Unit 5 encompasses the environmental media at the Fernald site and surrounding areas that could be impacted by the facility. While other Operable Units focus on specific waste facilities or defined areas, Operable Unit 5 is concerned with those environments that could be affected by the Fernald site. "Environmental media" includes the groundwater, surface water, soils, sediments, air, vegetation and wildlife throughout the Fernald site and surrounding areas. The groundwater includes the Great Miami Buried Valley Aquifer, a source of water in the vicinity of the Fernald site. Surface waters include the Great Miami River, Paddy's Run, and the Fernald site's storm sewer outfall ditch. Sediments in Operable Unit 5 include solid materials carried in stormwater runoff or plant effluent discharges to surface waters or drainage ditches.

Soils on and off the Fernald site boundaries also are being investigated for possible contamination due to past discharges or air emissions.

RI/FS Activities

Operable Unit 5 Work Plan Addendum: An addendum to the RI/FS Work Plan was submitted to the U.S. EPA and the Ohio EPA outlining additional investigations necessary to support Operable Unit 5. The addendum has been revised to incorporate U.S. and Ohio EPA comments. The revised addendum was submitted to the U.S. and Ohio EPAs in October 1992 for review. The U.S. EPA and Ohio EPA conditionally approved the work plan in November 1992.

The addendum proposed limited investigations to resolve some remaining issues regarding the nature and extent of chemical and radiological constituents in the subsurface soils and groundwater at the Fernald site. The investigations included sampling of soils and perched groundwater in the former production area adjacent to the Plant 1 Pad, fire training area, electrical substation and several underground pipelines. This sampling effort is complete and laboratory analyses are in progress.

Other field work for Operable Unit 5 includes an additional investigation of the glacial overburden, which is a deposit of clay, sandy-clay, and silty-clay which underlies the Fernald site but overlies the Great Miami Buried Valley Aquifer. Since water does not readily flow through clay, the glacial overburden helps protect the underlying aquifer from surface contamination. Because of the importance of the glacial overburden, additional hydraulic data are being gathered to further calculate how effective it is in protecting the aquifer.

The degree of protection provided by the overburden is crucial in deciding how contamination within the overburden should be addressed in final remediation. The additional hydraulic data will also be used to create a more refined groundwater transport model, which is needed to make long-term predictions of how contamination might move through the overburden. Additional hydraulic data and a more refined groundwater model will be used to support RI/FS documents for Operable Unit 5.

Reports: The U.S. EPA approved the revised Operable Unit 5 Treatability Study Work Plan in September 1992. The treatability work plan is designed to examine physical separation and chemical extraction of uranium from soils. A pilot unit is being installed in Plant 8 at Fernald to demonstrate the feasibility of soil washing as a remedial technology for cleaning Fernald site soils. The pilot unit is on schedule to be operational in February 1993. Data generated from the study will be used to support the Operable Unit 5 Feasibility Study and subsequent remedy selection.

DOE submitted the work plan for the installation of a well at Manhole 180 to the U.S. EPA and Ohio EPA in October 1992. DOE is now preparing responses to U.S. and Ohio EPA comments on the work plan. Both U.S. EPA and Ohio EPA are aware that the well has been installed, and preliminary data results indicate uranium concentrations are at background levels.

The Initial Screening of Alternatives (ISA) for Operable Unit 5 was submitted to the U.S. EPA November 13, 1992. The U.S. EPA has conditionally approved the report pending incorporation of U.S. EPA comments. The ISA involves the development and screening of remediation alternatives, and identifies remedial action objectives, contaminants of concern in various environmental media (such as uranium in soils), exposure pathways, and preliminary remediation goals. The report also identifies and evaluates possible ways to clean contaminated environmental media, and develops alternatives to address contaminated groundwater, soils, and sediments. During later stages of the Feasibility Study, the alternatives for the entire scope of Operable Unit 5 will be refined in detail and evaluated.

Removal Actions

Contaminated Water Beneath FEMP Buildings

(Removal Action No. 1): This Removal Action was initiated to minimize the potential for uranium-contaminated groundwater to infiltrate the underlying aquifer from perched water zones located beneath some former production buildings. "Perched" water is present in isolated pockets of groundwater within the layers of clay-rich glacial soils that exist above the Great Miami Buried Valley Aquifer in the Fernald area.

Perched water zones beneath Plants 6, 2/3, 8, and 9, are of concern due to the discovery of significant concentrations of uranium and volatile organic compounds. To minimize the potential for the movement of contaminated water in these zones to the underlying aquifer, a series of wells were installed to extract the perched groundwater for treatment.

Pumping operations are in progress at all locations. A treatment system at Plant 8 uses activated carbon filters to remove any volatile organic compounds from the extracted water. The water is then processed through the Fernald site's existing water treatment system for the removal of uranium and eventually

discharged to the Great Miami River. As of February 1, 1993, approximately 300,000 gallons of extracted perched groundwater have been processed through the treatment system at a rate of approximately 5,000 gallons per week. Treatment of perched groundwater will continue in this manner until the Advanced Waste Water Treatment system is operational in 1994.

South Groundwater Contamination Plume (Removal Action No. 3): The purpose of this Removal Action is to protect public health by limiting access to the use of uranium-contaminated groundwater in an area south of the Fernald site. This Removal Action is broken into five parts.

Part 1 provided an alternate water source to an industry affected by the contamination plume. This portion of the project involved the installation of production wells outside the plume area and a water supply system to the affected industry. Part 1 construction was completed December 7, 1992. Following Ohio EPA approval to begin operation, there will be a 60-day operating acceptance period before the system is turned over to the affected industry.

Another affected industry, which uses a minimal amount of groundwater for non-drinking purposes, will be provided with an alternate water supply by being connected to the proposed public water system. In January 1993, the Department of Energy agreed to pay Hamilton County \$4,501,516 for DOE's share of the cost of providing the public water system.

Part 2 involves the installation of a groundwater recovery well system to extract and pump groundwater from the South Plume through a force main back to the Fernald site for monitoring and subsequent discharge to the Great Miami River.

Use of the Fernald site's current effluent outfall pipeline to the Great Miami River will be discontinued due to its age and limited capacity to handle future flow. A new effluent outfall pipeline is being installed under Part 2 of this Removal Action. The new outfall pipeline will parallel the existing outfall pipeline to the Great Miami River.

Part 2 work also includes increasing the pump-out capacity at the Stormwater Retention Basin to reduce the potential for future overflow of the basin.

The construction of the force main, the new outfall pipeline, and providing increased pump-out capacity at the Stormwater Retention Basin, began in July 1992.

Construction of the new outfall pipeline was put on hold in September 1992 when contaminated soils and concrete construction rubble were discovered near the discharge pipeline to the river. The rubble had been placed on the riverbank years ago to prevent erosion near the discharge pipeline. The U.S. EPA approved a revision to the Part 2 construction procedure to allow construction of the new pipeline to continue while cleanup of contaminated materials was in progress. A cofferdam structure was used to complete construction of the outfall to the river.

Soils and rubble within the cofferdam have been removed and returned to the Fernald site for monitoring and evaluation to determine appropriate disposition. In addition, monitoring is being performed to determine the extent of any remaining contamination in the vicinity of the discharge pipeline adjacent to the cofferdam. Construction of the force main and outfall pipeline from the Part 2 well field to the Great Miami River is progressing on schedule.

Construction of the Part 2 well field and the associated test well are on hold pending property acquisition through condemnation. As a result of property acquisition difficulties, the DOE requested and the U.S. EPA approved a schedule extension for completion of the groundwater recovery well system. The groundwater recovery well system, originally scheduled to be operational by January 29, 1993, is now scheduled to be operational by August 28, 1993.

Construction of a Dissolved Oxygen System is now in progress under Part 2. It was determined that the groundwater to be extracted under Part 2 of this removal action has a low dissolved oxygen content. The Fernald site's National Pollutant Discharge Elimination System (NPDES) permit requires Fernald site wastewater to be discharged at a minimum of five parts of dissolved oxygen per million parts of water (ppm). Groundwater extracted under Part 2 will be aerated prior to discharge to the Great Miami River in order to comply with the Fernald site's current NPDES permit.

Part 3 involves construction of an Interim Advanced Wastewater Treatment (IAWWT) system. The IAWWT system removes uranium from site wastewater streams and, by doing so, reduces the amount of uranium discharged to the Great Miami River. This treatment capacity will compensate for the additional planned discharges of uranium from the South Plume to the river. The design of the IAWWT system was modified to incorporate the additional treatment capacity required to address the relocation of the Part 2 well field. The new location is in an area of higher uranium concentration which means that more uranium will have to be removed from site wastewater streams to achieve the desired reduction of uranium discharges to the river.

Two trailer-mounted IAWWT facilities and associated support systems comprise the IAWWT unit located near the Stormwater Retention Basin, and a second IAWWT unit is located at the Fernald site's existing Bionitrification Effluent Treatment building. The IAWWT system became operational on July 30, 1992.

The IAWWT unit at the Bionitrification building was taken off line in August 1992 due to operational difficulties. Alterations are now being made to that unit. The IAWWT system will be returned to operational status before the pumping of contaminated groundwater is initiated under Part 2 in August 1993; therefore, the negotiated reduction of

uranium discharges to Great Miami River will not be affected by current IAWWT operational difficulties.

Part 4 of the Removal Action involves groundwater monitoring and institutional controls to prevent the use of contaminated groundwater. This activity is being implemented through the Fernald site's existing Groundwater Monitoring Program. The program has been expanded to include more frequent monitoring of private wells located near areas of known contamination.

Part 5 involves additional groundwater investigations in the vicinity of the South Plume to identify the location and extent of any remaining contamination attributable to Fernald in the groundwater south (downgradient) of the recovery wells to be installed under Part 2.

The Part 5 investigation includes HydroPunch® sampling, sampling of existing monitoring wells, and groundwater modeling activities. Hydropunching is an efficient method for extracting groundwater samples without the expense of installing wells. The initial phase of Hydropunching is complete.

Because the U.S. EPA has issued a proposed limit of 20 parts per billion (ppb) for uranium in drinking water, the Part 5 investigation will attempt to identify the location of the leading edge of the plume exceeding the 20 ppb level.

Collect Uncontrolled Production Area Runoff - Northeast (Removal Action No. 16): The scope of this Removal Action is to collect stormwater runoff from perimeter areas of the 136-acre production area which are not presently draining into the Stormwater Retention Basin. Construction is in progress along the north perimeter fence, where a trench has been excavated and the trench base has been poured to intercept the flow of stormwater. This project is on schedule for completion in August 1993.

Cleanup Alternatives

While a range of alternatives are under consideration for dealing with contaminated groundwater, the most viable alternative currently appears to be pumping it out of the ground and returning it to the Fernald site for possible treatment and discharge to the Great Miami River.

Cleanup alternatives for soils and sediments include removing and treating them for disposal either at the Fernald site or an off-site disposal facility, or treating contaminated soils and sediments in place and isolating the materials from the environment with a protective covering system.

More information about Operable Unit 5 is available in the Public Environmental Information Center (PEIC), where Fernald Project cleanup documents are kept in the Administrative Record. The PEIC is located in the JAMTEK building, 10845 Hamilton-Cleves Highway, Harrison, Ohio, 45030. The telephone number is (513) 738-0164.